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THE COUPLED CLUSTER THEORY ELECTRON CORRELATION WORKSHOP "FIFTY YEARS OF THE CORRELATION PROBLEM"

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In extended systems like polymers and solids, correlation effects are critical to properties like cohesive energies, energy bands, and particularly band gaps; other optical properties like exciton spectra or non-linear optical behavior; and collective phenomena as in conductivity and superconductivity. Without adequate inclusion of electron correlation, theory cannot be predictive.

About 50 years after the correlation problem was clearly identified, we were in a position to report on the remarkable progress that has been made and to point the way to the future. These accomplishments have been achieved by a combination of critical formal and methodological developments in the theory such as coupled-cluster theory, many-body perturbation theory, propagator methods, and of configuration interaction methods coupled to the dramatic progress in computational power. Together, today, accurate applications to molecular many-electron systems are possible. This meeting addressed developing a similar capability for the reliable introduction of electron correlation to extended systems.

To achieve some historical perspective, several of the pioneer investigators who have made contributions to the correlation problem spoke at the meeting. This, in fact, enabled us to have representatives of the four scientific generations of investigators who have worked on the correlation problem.

The meeting was attended by 88 scientists from over 30 different countries. Thirty-seven invited presentations were made, augmented by 37 poster presentations. In a panel session, we addressed the timely topic of "With Density Functional Theory, Is there Any Future for *ab initio* Correlated Methods?" which generated much discussion.

The Proceedings, which consists of 25 papers, will be published in *Molecular Physics*. Copies of the Proceedings will be sent to AFOSR as instructed when they become available.